SENSOR TESTER
KASTAR NO. 272A

Part Number 20104

The Sensor Tester was developed as a fast and accurate method of testing various components on transportation vehicles to determine if they are functioning improperly.

The tester can be powered by a 9 volt alkaline battery or a 110 VAC to 12 VDC adapter, (Kastar Part No. 296A).

The Sensor Tester was developed as an inexpensive hand tool to aid in trouble-shooting transportation vehicles by determining if improper function of a component is contributing to diagnosed vehicle malfunctions.

Testing procedures vary from component to component and at times between various manufacturers of the various components. All tests require the sensor or component to be removed from the vehicle prior to testing. The procedures listed below describe the hook-up and list the various steps to follow to determine if the component is functioning properly or not. "Pass" or "Fail" conditions will be determined by checking to see if the Test Unit LED is either "ON" or "OFF" as indicated.

All tests require the Sensor Tester to be assembled. To assemble the Test Unit, simply plug the shrouded 3-pin male end of the Tester Lead Wire Component into the 3-pin female end of the Tester LED Component and attach a fully energized 9-volt battery or 110 VAC to 12 VDC adapter to the Assembled Test Unit's battery plug. Always disconnect the 9-volt battery or 110 VAC to 12 VDC adapter prior to storage of the Sensor Tester. The Tester LED Component and the Tester Lead Wire Component can remain connected in storage.

Components that this device tests include, but are not limited to:

1. Idle Speed Controllers
2. Throttle Position Sensors
3. EGR Valve Position Sensors
4. Ford Starter Relays
5. GM Diesel "Glow Plug" Relays

NOTE: Prior to hooking up the Sensor Tester leads make sure all terminals are clean and corrosion free to assure good circuit contacts. Always repeat each test procedure several times to verify test results, and make sure the 9-volt alkaline battery is fully energized.

FORD IDLE SPEED CONTROL MOTOR

TEST #1
This test assures the idle speed control motor is functional and the motor nose arm properly extends and retracts.

TEST #1 HOOK-UPS
Connect the Sensor Tester assembly to the idle speed control motor as follows:

IDLE SPEED CONTROL MOTOR LEAD COLORS	TESTER LEADS
RED (Battery +)	RED
BLACK (Idle Speed Control Motor Ground)	BLACK

TEST #1 PROCEDURE
1. The idle speed control motor will begin running as soon as the circuit connections are completed. The motor nose arm should fully extend. After it is fully extended, the motor will bog down and stop running.
2. Reverse the polarity of the connection (hook the red Test Unit lead to the idle speed control motor black lead and the black Test Unit lead to the motor red lead). The motor nose arm should retract fully. The motor will bog down and stop running when the motor nose arm is fully retracted.
3. If the motor nose arm does not fully extend or fully retract the idle speed control motor is defective and needs to be replaced.

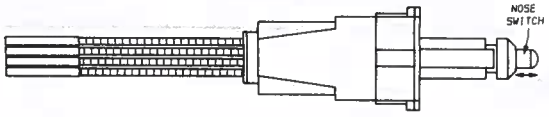
TEST #2
This test assures the idle speed control motor nose switch is functioning properly.

TEST #2 HOOK-UPS
Connect the Sensor Tester assembly to the idle speed control motor as follows:

IDLE SPEED CONTROL MOTOR LEAD COLORS	TESTER LEADS
ORANGE (Nose Switch)	BLACK
PURPLE (Nose Switch)	GREEN

TEST #2 PROCEDURE
1. The Test Unit LED should be "ON" bright at this point. If the Test Unit LED is off and all connections are proper the idle speed control motor is defective and needs to be replaced.
2. Depress the nose switch with your finger. The Test Unit LED should turn "OFF" with the nose switch depressed. The Test Unit LED should turn on bright when you release the nose switch. Repeat this step several times to verify the test results. If the Test Unit LED does not turn off when the nose switch is depressed, the idle speed contol motor is defective and needs to be replaced.

CAUTION: Disconnect the test circuit as soon as you've verified the test results. Leaving the circuit connected to the idle speed control motor with the motor nose arm fully extended or fully retracted for an extended period of time may damage the idle speed control motor.



	TESTER		MOTOR
TEST#1 PROCEDURE	RED	to	RED (Battery "+")
	BLACK	to	BLACK (Ground)
	Nose Should Extend		
	RED	to	BLACK (Ground)
	BLACK	to	RED (Battery "+")
	Nose Should Retract		
TEST #2 PROCEDURE	BLACK	to	ORANGE
	GREEN	to	PURPLE
	LED Should be ON		
	Depress Nose Switch		
	LED Should Turn OFF		

G.M. IDLE SPEED CONTROL MOTOR

TEST #1
This test assures the idle speed control motor is functional and the motor nose arm properly extends and retracts.

TEST #1 HOOK-UPS
Connect the Sensor Tester assembly to the idle speed control motor as follows:

IDLE SPEED CONTROL MOTOR PIN NUMBERS	TESTER LEADS
4 (Battery +)	RED
3 (Idle Speed Control Motor Ground)	BLACK

TEST #1 PROCEDURE
1. The idle speed control motor will begin running as soon as the circuit connections are completed. The motor nose arm should fully extend. After it is fully extended, the motor nose arm should oscillate in the fully extended position and you will hear a "knocking" noise. This is normal.

CAUTION: Disconnect the test circuit as soon as you've verified the test results. Leaving the circuit connected to the idle speed control motor with the motor nose arm fully extended or fully retracted for an extended period of time may damage the idle speed control motor.

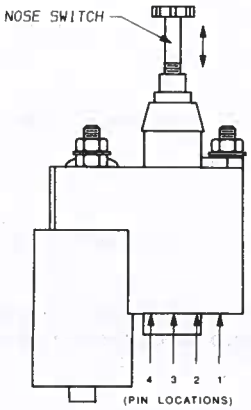
2. Reverse the polarity of the connection (hook the red Test Unit lead to the idle speed control motor pin number 3 and the black Test Unit lead to pin number 4). The motor nose arm should retract fully. The motor will bog down and stop running when the motor nose arm is fully retracted. In the fully retracted position, you will not be able to depress the nose switch (see Test #2).
3. If the motor nose arm does not fully extend or fully retract the idle speed control motor is defective and needs to be replaced. If the nose switch can still be depressed and the motor nose arm will not retract any further, the idle speed control motor is defective and needs to be replaced.

TEST #2
This test assures the idle speed control motor nose switch is functioning properly.

TEST #2 HOOK-UPS
Connect the Sensor Tester assembly to the idle speed control motor as follows after you extend the motor nose arm approximately half way using the Test #1 hook-ups and procedure.

IDLE SPEED CONTROL MOTOR PIN NUMBERS	TESTER LEADS
1 (Nose Switch)	BLACK
2 (Nose Switch)	GREEN
	(Polarity Doesn't Matter)

TEST #2 PROCEDURE
1. The Test Unit LED should be "OFF" or very dim at this point. If the Test Unit LED is on bright and all connections are proper the idle speed control motor is defective and needs to be replaced.
2. Depress the nose switch with your finger. The Test Unit LED should turn "ON" bright with the nose switch depressed. The LED should turn "OFF" when you release the nose switch. Repeat this step several times to verify the test results. If the Test Unit LED does not turn on when the nose switch is depressed the idle speed control motor is defective and needs to be replaced.



	TESTER		MOTOR
TEST #1 PROCEDURE	RED	to	#4 PIN (Battery "+")
	BLACK	to	#3 PIN (Ground)
	Nose Should Extend		
	RED	to	#3 PIN (Ground)
	BLACK	to	#4 PIN (Battery "+")
	Nose Should Retract		
	EXTEND NOSE HALF-WAY		
TEST #2 PROCEDURE	BLACK	to	#1 PIN
	GREEN	to	#2 PIN
	Depress Nose Switch LED Should Turn ON		

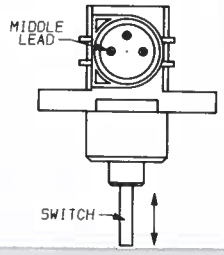
FORD EGR VALVE POSITION SENSOR

TEST #1
This test assures the EGR valve position sensor is capable of sending the ECM a varying signal to indicate EGR valve position.

TEST #1 HOOK-UPS
Remove the EGR valve position sensor from the EGR valve.
1. Connect the black Test Unit lead to the middle EGR valve position sensor pin. (This is the pin closest to the straight side of the EGR valve position sensor's "D" shaped plug).
2. Connect the green Test Unit lead to either of the two (2) remaining EGR valve position sensor pins.

TEST #1 PROCEDURE
1. Depending on the EGR valve position sensor lead selected in the hook-up procedure (step #2) for the green Test Unit lead, the Test Unit LED will be either "ON" or "OFF" to very dim.
2. Use your finger to slowly depress the EGR valve position sensor switch.
3. A. If the Test Unit LED was "ON" at initial hook-up, as you depress the EGR valve position sensor switch the Test Unit LED will gradually grow dimmer until it is very dim or off with the EGR valve position sensor switch fully depressed.
   B. If the Test Unit LED was "OFF" at initial hook-up, as you depress the EGR valve position sensor switch the Test Unit LED will gradually grow brighter until it is on bright with the EGR valve position sensor switch fully depressed.
4. Repeat this test several times to verify the test results.
5. If the Test Unit LED flickers or flashes off at any point during the stroke of the EGR valve position sensor switch, or does not change in intensity during the test, the EGR valve position sensor is defective and needs to be replaced.

NOTE: If the unit is defective in mid-stroke, you should be able to find a position within the EGR valve position sensor switch stroke where the unit is defective. By holding the sensor switch at this defective spot (without moving it) the Test Unit LED should continue to flicker or remain off.



TESTER		SENSOR
BLACK	to	MIDDLE LEAD
GREEN	to	EITHER SIDE

LED Either ON Bright or ON Dim

DEPRESS SWITCH

LED Goes Bright to Dim OR Dim to Bright

FORD STARTER RELAY AND G.M.GLOW PLUG RELAY

* Note - A 12 VDC power supply is required to perform this test. Kastar #296A 120 VAC adapter provides the proper power requirement.

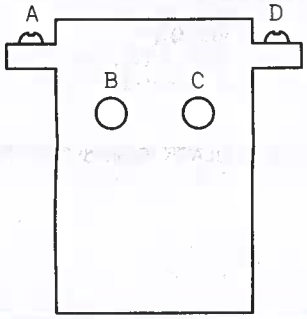
TEST #1
This test assures that the relay properly triggers when correct input is applied.

TEST #1 HOOK-UPS

RELAY	TESTERLEADS
A (coil)	GREEN
C (battery)	RED
D (ground)	BLACK

TEST #1 PROCEDURE

1. The Test Unit LED should be "OFF" at this point. If the Test Unit LED is on and the connections are proper, the relay is defective and should be replaced .
2. Connect one end of the yellow jumper wire to the "D" terminal of the relay or the black Test Unit lead. Make sure both the black Test Unit lead and the yellow jumper wire are connected to relay terminal "D".
3. Touch the other end of the yellow jumper wire to relay terminal "B". The Test Unit LED should turn "ON" and you should hear the relay "click". Remove the yellow jumper wire from relay terminal "B" and the Test Unit LED should go off. Repeat this several times to verify the test results.
4. If the relay fails to "click" and the Test Unit LED fails to turn on each time Step #3 is repeated, it means the relay is sticking intermittently and is defective and should be replaced.



	TESTER		RELAY
TEST #1 PROCEDURE	GREEN	to	A (Coil)
	RED	to	C (Battery "+")
	BLACK	to	D (Ground)
	YELLOW JUMPER	to	D (Ground)
	LED Should Be OFF		
	YELLOW JUMPER	to	B
	LED Should Turn ON		
	Relay Should Click		

GM. THROTTLE POSITION SENSOR

TEST #1
This test assures the throttle position sensor is capable of sending the ECM a varying signal to indicate throttle position.

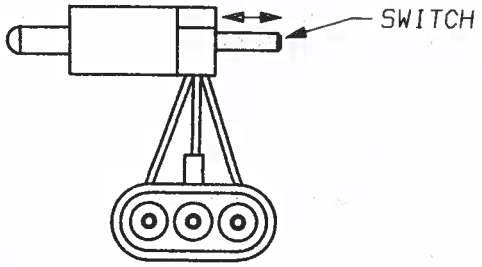
TEST #1 HOOK-UPS
Throttle position sensors come in a variety of configurations. Fuel injection throttle position sensors are rotary. The output signal end may be a plug, pins, or simply wires. However, this hook-up works for all styles.

1. All throttle position sensors have three (3) output leads. Connect the black Test Unit lead to the middle throttle position sensor lead. This may be the middle wire, the middle terminal of a plug, etc.
2. Connect the green Test Unit lead to either of the two (2) remaining throttle position sensor leads.

TEST #1 PROCEDURE

1. Depending on the throttle position sensor lead selected in the hook-up procedure (step #2) for the green Test Unit lead, the Test Unit LED will be either "ON" or "OFF" to very dim.
2. Use your finger to slowly depress the throttle position sensor switch.
3. A. If the Test Unit LED was "ON" at initial hook-up, as you depress the throttle position sensor switch the Test Unit LED will gradually grow dimmer until it is very dim or off with the throttle position sensor switch fully depressed.
   B. If the Test Unit LED was "OFF at initial hook-up as you depress the throttle position sensor switch the Test Unit LED will gradually grow brighter until it is on bright with the throttle position sensor switch fully depressed.
4. Repeat this test several times to verify the test rest results.
5. If the Test Unit LED flickers or flashes off at any point during the stroke of the throttle position sensor switch, or does not change in intensity during the test, the throttle position sensor is defective and needs to be replaced.

NOTE: If the unit is defective, in mid-stroke, you should be able to find a position within the throttle position sensor switch stroke where the unit is defective. By holding the sensor switch at this defective spot (without moving it), the Test Unit LED should continue to flicker or remain off.



	TESTER		SENSOR
TEST #1	BLACK	to	Middle Lead
PROCEDURE	GREEN	to	Either Side

LED EITHER **ON** BRIGHT OR **ON** DIM

DEPRESS SWITCH

LED Goes Bright to Dim OR Dim to Bright